Original Article

Need of O_2 after Anesthesia & Surgery

Need of Oxygen Administration in Post Anesthesia Care Unit (PACU) with Respect to Type of Anaesthesia and Surgery

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ABSTRACT

Objective: To determine the frequency of patients needing oxygen administration in PACU with respect to type of anaesthesia and surgery.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Post Anesthesia Care Unit (PACU) of a public sector Tertiary Care Hospital Peshawar during July to September 2019.

Materials and Methods: Using consecutive sampling techniques, every patient on arrival at PACU was examined for need of oxygen supplementation and data were noted on structured Performa. A total of 385 sampled patients were included in the study. Data were entered and analyzed by SPSS version 20. Chi Square Test was used to compare need of oxygen with respect to gender, age, site of surgery and types of anesthesia, where p-value <0.05 was considered as significant.

Results: A total of 385 surgical patients having mean age of 37.2± 22.2 were observed for oxygen need, out of whom 159(41.3%) were male and 226(58.7%) female. the need of oxygen supplementation was observed only in 62(16.1%) out of whom male accounted for 42(10.9%). Most 28(7.3%). of patients who needed oxygen supplement were belonging to > 60 years while 22(5.7%) were from patient with age of < 5 years old (p <0.001). Similarly majority 46 (11.9%) of them had midline surgery while very few of patient who have surgeries of peripheral site neck region needed oxygen supplementation. Furthermore, 52 (13.5%) of patient who had general anaesthesia with Endotrachial tube and 2 (0.5%) who had GA with Ketamine and Dormicum required oxygen supplementation.

Conclusion: An enough amount of oxygen could be saved if oxygen administration to patients is practiced according to the need of patients observed through pulse oximetry. The common factors for hypoxemia among patients in PACU are extreme low and old age, midline surgery and GA with ETT.

Key Words: Hypoxemia, Oxygen Supplementary, Post Anaesthesia Care Unit, surgery, anaesthesia

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INTRODUCTION

Oxygen administration to post-operative patients has been in routine practice in most of the hospitals. It is considered as safe and effective method to ensure proper oxygen supplementation to postoperative patients.[1] Every patient regardless of the clinical condition and nature of operation is getting the post-operative oxygen in recovery room.

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An irrational use of oxygen could be prevented if need for oxygen supply of a patient is evaluated.[2]

though hypoxia is considered to be common complication however, it is recommended that oxygen should be administered in post-operative care unit (PACU) when it is clinically indicated.[3] This will lead to a rationale and cost effective use of oxygen in the hospital.[4] There are multiple studies who have reported the irrational use of oxygen in recovery room (post anesthesia care unit). Though, the incidence of hypoxia in postoperative patients are about 12-30% in one study, however, it has been recommended that every patients needs oxygen supplementation. The need is obvious when oxygen saturation on pulse-oximeter is 92% or below.[5, 6] Based on this recommendation 63% of patients in post anesthesia care unit do not need oxygen administration.[4] It is recommended that each patient's oxygen saturation should be checked through pulse-oximeter[7] at the time of admission to PACU and only those patients should be given oxygen supply who really need it.[8 9] The routine administration has declined after introduction of use of pulse-oximeter in such

Situation. It is also important that in some surgery oxygen supplementation is vital and needs to be given. The need of oxygen supplementation may increase or decrease over period of time in PACU. We want to conduct a study to determine the need of oxygen supplementation to patients and compare by type of surgery and mode of anesthesia.

MATERIALS AND METHODS

This was a cross sectional study conducted in Recovery Room (Post Anesthesia Care Unit) of a Public Sector Teaching Hospital during July to September 2019. Assuming Confidence interval 95%, anticipated population 0.50 and 0.05 of study power total of 385 patients undergoing to surgery during the data collection period were observed for study variables. Using consecutive sampling approach all patients undergone through different type anesthesia for surgical procedures were included in the study while patients with known comorbidities which can alter normal breath of patients and lead to low oxygen saturation were excluded. Data were collected on structured Performa after approval of proposal from Ethical Review Committee of the Teaching Hospital.

Every patient as per inclusion criteria and operational definition received at recovery room were assessed for oxygen saturation using the pulse-oximeter. The patients were assessed for the need of supplemental oxygen on the basis of their oxygen saturation on pulse oximeter. Need of oxygen supplementation were determined by cut off 92% oxygen saturation on pulse oximeter. Data were analyzed using SPSS version 20. Results were subjected for appropriate statistical analysis. For continuous data, mean and standard deviation were calculated, while categorical variables were presented in term of frequency and percentages. The variable like need of oxygen was compared in respect to age, type of anesthesia and surgery using the Chi Square Test where p-value <0.05 was considered as significant.

RESULTS

A total of 385 surgical patients with mean age of 37.2± 22.2 (ranged 1 month to 88 years), out of them 159(41.3%) were male and 226(58.7%) were female. Need of oxygen supplementation on the basis of pulse oximeter reading was observed among 62 (16.1%) patients. Among total 159(41.3%) were male, out of whom 42(10.2%) needed oxygen administration while 11(30.4%) had not needed oxygen. Similarly among female only 20 (5.2%) needed oxygen supplementation which indicates that the number of male patients who required oxygen supplementation was higher as compare to female patients and the difference was statistically significant (p <0.001). The comparative analysis of Oxygen requirement with respect to age of patient indicate that there was 51(13.2%) of patients were from age of <5 years out of whom 22(5.7%) needed oxygen supplementation.

Table No.1: Need of Oxygen supplementation with respect to gender and age

Variables	Need of Oxygen		Total	p-Value
	Yes	No		
	Freq (%)	Freq (%)		
Gender wise comparison of oxygen supplementation need				
Male	42(10.9%)	117(30.4%)	159(41.3%)	< 0.001
Female	20(5.2%)	206(53.5%)	226(58.7%)	
Need of Oxygen supplementation with respect to age				
< 5	22(5.7%)	29 (7.5%)	51 (13.2%)	< 0.001
5-17	4 (1.0%)	14 (3.6%)	18 (4.7%)	
18-20	0(0.0%)	20 (5.2%)	20 (5.2%)	
21-29	6 (1.6%)	67 (17.4%)	73 (19.0%)	
30-39	0 (0.0%)	44 (11.4%)	44 (11.4%)	
40-49	0 (0.0%)	52 (13.5%)	52 (13.5%)	
50-59	2 (0.5%)	61 (15.8%)	63 (16.4%)	
60 and above	28 (7.3%)	36(9.4%)	64(16.6%)	

Table No. 2 Need of oxygen with respect to type of anaesthesia and region of surgery

Variables	Need of Oxygen		Total	p-Value
	Yes	No		
	Freq(%)	Freq (%)		
Need of oxygen with respect to region of surgery				
Abdominal	46(11.9%)	200(51.9%)	246(63.9%)	0.07
Thoracic	8 (2.1%)	29 (7.5%)	37 (9.6%)	
Neck	0 (0.0%)	10 (2.6%)	10 (2.6%)	
Limbs	4 (1.0%)	58 (15.1%)	62 (16.1%)	
Others	4 (1.0%)	26 (6.8%)	30 (7.8%)	
Need of oxygen with respect to types of anaesthesia				
Regional Blocks	0 (0.0%)	52(13.5%)	52(13.5%)	0.002
Local	0 (0.0%)	03 (0.8%)	03 (0.8%)	
GA with ETT	52 (13.5%)	203 (52.7%)	255 (66.2%)	
GA without ETT	2 (0.5%)	33 (8.6%)	35 (9.1%)	
GA with Ketamin Dormicum	8 (2.1%)	32 (8.3%)	40 (10.4%)	

Similarly patients with age 5-17 years accounted from 18(4.7%), among them only 4(1.0%) required oxygen administration. There was 20 (5.2%) of patients belonging to age group of 18 to 20 years out of whom, non shown need for oxygen supplementation. However, among 73 (19.0%) of patients age ranged from 21 to 29 year only 6(1.6%) required oxygen. The patients with age of 30 to 39 year accounted for 44(11.4%) of total and none of them required oxygen. Similarly, the proportion of patient with age 40 to 49 years was 63 (16.4%) where only 2 (0.5%) required oxygen supplementation. Patients with age 60 and above were 64(16.6%) where 28 (7.3%) of them required oxygen administration as shown in table 1. Comparison of oxygen need with respect to region of surgery revealed that there were 246(639%) who had midline surgical

procedures, 37(9.6%) had surgery of thoracic region, 10(2.6%) had surgery of neck region. Similarly, 62 (16.1%) of patients undergone through surgery of limbs (upper and lower Limbs) while 30(7.8%) had surgery of other region. Most of 46 (11.9%) patients with surgery of abdominal region followed by 8(2.1%) of patients with surgery of thoracic region. A few 4(1.0%) patients with surgery of either upper or lower limbs required oxygen supplementation. The difference among these proportion was statistically not significant (p=0.07).

Comparison of oxygen need with respect to type of anaesthesia indicates that 255 (66.2%) of patient had general anaesthesia (GA) with ETT followed by 52 (13.5%) Regional Blocks, 40 (10.4%) GA with Ketamin Dormicum, 35 (9.1%) GA without ETT ((mask and Intravenous Propanol) and 03 (0.8%) had local anaesthesia respectively. Among patients with Regional Blocks and local anaesthesia none of them had required oxygen. While patients who GA with ETT, 52(13.5%) of them required oxygen supplementation. Among patients who had GA with Ketamin and Dormicum only 8(2.1%) shown oxygen requirements similarly among patients undergone through GA without ETT, only 2(0.5%) required oxygen administration. These difference were statistically significant (P=0.002)**.**

DISCUSSION

The ultimate goal of post-operative care in recovery room or post-operative anaesthesia unit (PACU) is to ensure normal respiratory function of patients undergone through surgery. Therefore, mostly the administration of oxygen to the patients in PACU is practiced in most of the hospitals and is considered as safe strategies. However, question is being raised by most of the researchers, whether every patient needed oxygen. This study also aims to determine the need of oxygen supplementation among patients with respect to the anaesthesia types and region of surgery. Owing a hospital based cross sectional study a total of 385 patients regardless of surgical procedure and type's anesthesia were observed for need of oxygen administration in PACU. The patients were divided in to two groups based on oxygen saturation measured through pulse oximeter. The patients who have oxygen saturation 92% and below were considered as having need of oxygen supplementation. A previous study indicates that 12.2% of patients in PACU had mean oxygen saturation less than 92%. [10] The results of present study indicate that only 62(16.1%) patients were requiring the need of oxygen supplementation where observed using the pulse oximeter. This indicates that pulse oximetry allows a selective administration of oxygen in PACU resulting into a cost effective therapy. Such findings are reported by most of the studies.[11 12] among those who had need of oxygen 42(10.9%) were male and 20(5.2%) were female revealed a significant different (p=0.002). In previous studies the male gender was associated to higher probability of hypoxemia after surgical procedure. [11 13]

Results of present study further indicates that oxygen requirement in PACU was common among patients with 60 years and above followed by patient with < 5 years age respectively meaning that oxygen requirement increases in either early age or late age. The findings of present study in this regard are in consistence with other literatures. It has been further reported by other studies that effect of advanced age especially after 60 years become notable for oxygen need in post-operative cases because at this age patients usually have other comorbidities like COPD and other risk factors. The situation become more notable at this age when a patient have history of smoking.[13 14 15]

Apart from gender and age the oxygen requirement in PACU varied with respect to types of anaesthesia and region of surgery. The results reveal that out of 62(16.1%) who needed oxygen supplementation, majority 46(11.9%) were undergone through midline region surgeries (abdomen, Reproductive and Urinary system) followed by 8(2.1%) of patients with surgery of thoracic region and 4(1.0%) of patients undergone through surgery of ether upper limbs or lower limbs. This indicates that surgical site plays an important role in health care as the risk of complications especially the respiratory complications varies according to the site of surgery.[16] The surgical procedures performed at midline of the body especially near to diaphragm lead to postoperative respiratory complication.[13 14] in present study patients with surgical procedure on thoracic region also needed oxygen supplementation. These results also showed consistency with findings of other studies. [17] the oxygen need also affected by diagnose nature and time duration of surgical procedure[7] which is not compared in the present study.

Comparison of oxygen need with respect to type of anaesthesia in the present study indicates that among patients who were needing oxygen supplementation, majority of them have given general anesthesia along with endotracheal intubation, followed by those with general anaesthesia with Ketamine Dormicum. A minor proportion of patients with other types of anaesthesia were required oxygen administration in PACU. The previous studies also reported that need of oxygen grossly vary with respect to anaesthesia technique, drug concentration, types and duration of anaesthesia.[18 19] on other hand the status of room air in PACU also play important role. [4]**.**

CONCLUSION

A small proportion of patients received at Post-Operative Care Unit in tertiary care hospital really needed oxygen supplementation. Among them majority of patients belonged to extreme small and old age. Regarding site of surgery, patients undergone through

midline surgery or the one who had general anaesthesia with ETT needed oxygen supplementation**.**

Author's Contribution:

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